



SNAMP Owl Team Integration Meeting
UCANR Building, 2801 2nd Street, Davis, CA
June 20th, 2014 10 am – 2 pm

In attendance:

Justin Augustine – Cen. for Biological Diversity
Carrie Battistone – CA Dept. of Fish & Wildlife
Vince Berigan – University of Wisconsin
Doug Bevington – Environment Now
Roy Bridgman - USFS
Steve Brink – California Forestry Association
Sue Britting – Sierra Forest Legacy
Neil Clipperton – Ca. Dept. of Fish and Wildlife
Byron de Yampert – University of Wisconsin
Rebecca Ferkovich - CalFire
Pat Ferrell – USFS, El Dorado NF
Patricia Flebbe – US Forest Service Region 5
Rocky Gutierrez – University of Minnesota
Russ Henley – CA Natural Resources Agency
Peter Hopkinson – Univ. of California Berkeley
Kim Ingram – UC Cooperative Extension
Susie Kocher - UC Cooperative Extension

Nick Kryshak – University of Wisconsin
Dawn Lipton – USFS
Kevin Roberts – Sierra Pacific Industries
Karen Roshott – El Dorado Co. Teachers Ext.
Ryan Rudkin – El Dorado Co. Teachers Ext.
Ben Solvesky – Sierra Forest Legacy
Edward Smith – The Nature Conservancy
Doug Tempel - University of Wisconsin
Pat Trimble – US Forest Service, Eldorado NF
Dana Walsh - US Forest Service, Eldorado NF
Sheila Whitmore – University of Wisconsin

On-line:

Sarah Boogay, Bob Carey, Jeff Cordes,
Katherine Fitzgerald, Patti Krueger, Sarah
Sawyer, David Wright

I. Welcome and Overview: Susie Kocher welcomed the group, reviewed ground rules, meeting goals and objectives, and the agenda before having participants introduce themselves. They were asked to share their affiliation and one desired outcome they had for the meeting. Susie provided a brief history of the Sierra Nevada Adaptive Management Project and then continued to serve as the facilitator for remainder of the meeting. The meeting was also webcast and recorded. Associated documents can be accessed at: <http://snamp.cnr.berkeley.edu/events/jun-20-2014-owl-it-meeting>.

II. Population trends on the Eldorado Study area: Rocky Gutiérrez gave a brief overview of owl population studies that have helped to inform current research such as the Eldorado Density Study. For his dissertation, Doug Tempel compared population trends from occupancy and mark-recapture data on the Eldorado Density Study Area (EDSA) collected during 1993 to 2010. Doug also developed an integrated population model (IPM) to assess population trends using all data collected from 1990 to 2012. Rocky discussed the funding constraints in the early years that prevented complete survey coverage of the EDSA. 1993 was the first year with > 90% coverage and surveys at > 90% of owl territories which is why Doug used data beginning with that year for the occupancy and mark-recapture analysis.

Question: *Can you explain in greater detail why data from 1992 and earlier is not being used in this analysis?*

Answer: *Funding constraints and limited staff prevented consistent coverage of the study area prior to 1993 so certain data are not reliable (e.g., assessment of reproduction for some birds) prior to that time.*

Doug Tempel led the second part of this section discussing occupancy and abundance based on his doctoral thesis publication - Tempel, D. J. and R. J. Gutiérrez. 2013. *Relation between occupancy and abundance for a territorial Species, the California spotted owl*. Conservation Biology 27:1087-1095. His work supports the hypothesis that there is a fundamental relation that exists between occupancy and abundance. Doug explained the models he developed to support his conclusions that occupancy monitoring are suitable as a cost-effective alternative for monitoring spotted owl population trends with the important caveats that the results do not necessarily extend to non-territorial species. Further, he emphasized that mark-recapture studies still provide critical information that occupancy studies cannot.

The third part of this section included information on integrated population models (IPM) based on his publication - Tempel, D. J., M. Z. Peery, and R. J. Gutiérrez: *Using integrated population models to improve conservation monitoring: California spotted owls as a case study*, which has not been accepted for publication in Ecological Modelling. The information centered on the use of multiple data sources; how population size is linked to demographic rates (e.g., Leslie matrix); how individual data sets are modeled; and how inference is based on joint likelihood (i.e., multiplication of individual likelihoods). The potential benefits of using IPMs include the increased precision of parameter estimates, the ability to estimate parameters for which no specific data were collected, and the ability to account for all sources of uncertainty in the parameter estimates. Analysis of this data by the owl team has led to the conclusions that CSO population on the Eldorado has declined by 50% from 1990 to 2012 and that immigration is an important factor in the dynamics of this population. Also, further research is needed to help identify the causes of CSO population decline.

Question: *Are you saying the rate of reproduction on the EDSA is adequate, and inadequate immigration is the problem? Implying reproduction somewhere else is the problem?*

Answer: *We cannot point to one parameter (rate of reproduction) and say “that is the cause” because they (reproduction, immigration and adult survival) all contribute to population change. Annual changes in population growth rate maybe small but the cumulative effects are large over long time periods.*

III. Retrospective Analysis: Effects of Timber Harvest and Fire: Short-term effects of timber harvest and fire on spotted owls was discussed based on a retrospective analysis of data from the Eldorado Density, Regional, and Last Chance (SNAMP) study areas. The Owl Team developed annual vegetation maps for 74 owl territories and modeled the relationships between habitat/treatment, owl demographic and occupancy rates. The results are part of the publication: Tempel, D. J., R. J. Gutiérrez, S. A. Whitmore, M. J. Reetz, R. E. Stoelting, W. J. Berigan, M. E. Seamans, and M. Z. Peery. 2014. *Effects of forest management on California spotted owls: implications for reducing wildfire risk in fire-prone forests*. Ecological Applications: in press. Pre-print available at <http://www.esajournals.org/doi/abs/10.1890/13-2192.1>.

As part of the retrospective analysis, the Owl Team defined three timber harvest categories: Heavy – includes clear cut, overstory removal, seed tree removal, seed tree cut, and shelter wood removal/commercial thin; Medium (with and without understory removal) –includes commercial thinning, selection, single-tree selection, group selection, thinning for hazardous fuels removal, fuel break, SPLATS; and Light – includes pre-commercial thin and sanitation salvage. Characterizing the effect of habitat change and treatments on CSO demography is additionally challenged by items such as the correlative rather than experimental nature of study, the broad range of treatments and disturbances, the resolution of habitat map, and the coarse and subjective categorization of habitat classes.

The primary conclusions to date from the retrospective analysis include: high-canopy forest ($\geq 70\%$, classes 5 and 7) is the primary correlate of owl population growth and occupancy at the territory scale; high-canopy forest declined by 7.4% during the study, which may have contributed to declines in abundance from 1993-2012; timber harvest was not strongly correlated with territory-scale dynamics, but $> 90\%$ of medium-intensity harvests within high-canopy forests converted them to lower canopy cover class; and that some evidence suggests that high-intensity fire can negatively impact territory occupancy. Recommendations suggest that forest managers target forests with lower canopy cover for fuel treatments, and that fuel treatments should retain focus on removal of ladder fuels and smaller trees, while maintaining higher canopy cover.

Question: *Did you look into the effects of salvage logging?*

Answer: *No, there was not much salvage logging after the Star fire that occurred on our study area.*

Question: *Did you look at the effects of fire severity vs. tree mortality?*

Answer: *No*

Question: *Did you restrict parameterization of models due to small sample size? (David Wright will send the Owl Team the paper he is basing his question on).*

Answer: Doug mentioned that they used a three-stage modeling framework to reduce the number of models and the number of individual parameters in any given model.

Question: What does occupancy look like in these areas?

Answer: The number of occupied sites on a year to year basis is going down.

Question: Are the recommendations for fuels treatments based on observed effects of medium intensity harvest or on the importance of canopy cover?

Answer: They are based on the importance of canopy cover.

Question: Were weather or the proximity of harvest to territory centers covariates?

Answer: No. If you do not have the timing of the treatments, you can't link it to a treatment accurately so it can skew your data analysis. One would presume that there could be immediate effects after a treatment but how long that lasts is in question. We had some difficulties in simply finding out what year a treatment took place, much less what month.

Question: You recommend focusing on removing ladder fuels, but it doesn't seem like your study could really address the effect of this kind of treatment on owl occupancy, since you were really only looking at canopy cover. Is there some other evidence that this is a good recommendation for owl territories or at least not harmful within an owl territory. The recommendation seems to be just to do anything that would leave the canopy cover high.

Answer: We agree that something needs to be done to reduce fire risk. Removing ladder fuels is better than opening up the canopy. It has been shown that it is possible to greatly reduce understory without reducing canopy cover. [Note: having thought about this excellent question after the meeting, Rocky thinks that there is opportunity for reducing ladder fuels in dense stands without losing all the inherent vertical heterogeneity in stand structure. This might be accomplished by reducing density of trees but retaining some of all the smaller size classes, while maintain the large tree classes.]

Question: 30% to 70% canopy cover is a wide range and is hard to determine what does 50% to 60% do in comparison. Can you explain?

Answer: This is a question of thresholds and when do you go too low or too high and have a negative effect. The timing of a treatment and the percentage of canopy cover helps inform this. We know that CSO do not use really open areas except for foraging but what that threshold is, remains unknown.

Question: *In regards to the USFS canopy cover map development, they will have the capability of going to a finer scale than 1 year but it presents challenges to owl scientists. Will they try to look for some thresholds if 70% is robust or based on something else?*

Answer: *The USFS canopy cover map that is still under development will estimate canopy cover as a continuous variable, which would be an improvement over treating canopy cover as a categorical variable. However, at this time it is not possible to speculate on an approach or possibilities. It all depends on the final map product and its tested accuracy.*

IV. Progress update on prospective analysis of long-term effects of fuel treatments and fire:

Conclusions to date from the retrospective analysis show that a high-canopy forest ($\geq 70\%$, classes 5 and 7) was the primary correlate of owl population growth and occupancy at the territory scale; high-canopy forest declined by 7.4% during the study, which may have contributed to declines in abundance from 1993-2012; timber harvest was not strongly correlated with territory-scale dynamics, but $> 90\%$ of medium-intensity harvests within high-canopy forests converted them to lower canopy cover class; and that some evidence suggests that high-intensity fire can negatively impact territory occupancy [note added after meeting: salvage logging following fire would confound effects of territory occupancy. Small sample size precluded assessment of the effect of salvage logging + high intensity fire on owls vs. effect of just high intensity fire on owl occupancy]. Recommendations suggest that forest managers target forests with lower canopy cover for fuel treatments, and that fuel treatments should retain focus on removal of ladder fuels and smaller trees, while maintaining higher canopy cover.

Conservation Assessment Input: The lunch time break out discussion focused on how the USFS is preparing a California spotted owl conservation assessment that will be based on existing published literature. The assessment is intended to provide information to guide forest management in the Sierra Nevada. Participants were asked to provide input on what existing uncertainties regarding the owl would they like to see addressed in the conservation assessment?

Rocky provided some background on the CSO conservation assessment. Its purpose is to update the current knowledge which will be the foundation for an owl conservation strategy. The intent is to interpret research for management and make it more penetrable for managers. The context of the revision is after 20 plus years of CASPOW, what do we know and what do we still need to learn? They will include peer reviewed literature; some non-peer reviewed literature; and those things rejected by journals but still have merit based on reasons for rejection, the study design, and the quality of data. They will not include grey literature, raw data, or analyze raw data as CASPO did in 1992. The timeline is for the assessment to be compiled by the end of September and with January 30, 2015 (note: dates have changed since this meeting) being the tentative publication date. This coincides somewhat with the USFS plan revision process in which alternatives are due October 2014, and the EIS April 2015. The

USFS will have received internal review copies of the assessment by the end of November or early December.

The USFS goal is to ensure that they are doing a good job of CSO management and to produce a well thought out and supportive conservation strategy. Proposed sections include ecology, mapping forests, habitat use and distribution, population distribution and trends, forest ecosystem conditions, management and research implications, and what are the existing and potential threats. Rocky asked meeting participants what else they thought should be included. Participants suggested the following components:

- Identifying things that are important for planning rules
- CalFire VMP PTEIR
- Are S&Gs around CSO still relevant?
- Items that are still relevant to conservation strategy
- Evaluate conservation strategy in the 20 year old CASPOW
- Establish desired conditions for owls (this won't be done – the goal is to develop a broad overview of the owl knowledge – that has been the direction to the team which includes Malcolm, Brandon and John Keane). In this case, the team should try to present information on structure that is complementary to desired conditions in a forest plan
- Any information on pace and scale to help set the forest plan objectives
- Risk and uncertainty of climate change
- Critical data that needs to be collected (like better harvest data)
- Threats from wildfire
- Private land (raw data), FIA
- Population trends in the literature
- What is suitable habitat? What are the benefits / dynamics of a burned forest? Look at the effect of all fire severities in creating habitat types. Have burned forest habitat scientists been included on the panel?
- Historical conditions
- Effects of scale in different parts of the Sierra

V. Integration metrics for the final report: Integration metrics for the Owl Team consist of owl habitat and demographic metrics. Habitat metrics are at the fireshed scale which includes nesting habitat quality on a continuous scale based on canopy cover, large tree density, and vertical structure (Gini coefficient); PAC scale which consists of the change in nesting habitat quality within PACs; and the territory scale (400 ha) which is forested area with >70% canopy and >12 inch diameter trees (for the demographic analysis). The team used vegetation plot data from the Eldorado Density Study Area at nest sites and 36 random sites in vegetation classes 4, 5, 6, and 7; recorded canopy cover and all trees $\geq 6''$ dbh within 20 x 100 meter plots; and performed a logistic regression for owl nesting habitat versus

available habitat. The explanatory variables were large tree density, canopy cover, and Gini coefficient. Demographic metrics include reproduction, survival, territory extinction and colonization. The Owl Team will use the Last Chance vegetation maps under four different treatment scenarios and the logistic regression equation to predict the probability that each stand with $\geq 30\%$ canopy cover contains suitable owl nesting habitat. Any stand with $\leq 30\%$ canopy cover has zero probability of being owl nesting habitat. Owl habitat quality is equal to the sum of the probability of nesting habitat across all polygons.

Question: *Will the demographics on the Eldorado be used to project what might happen at Last Chance using info/maps the Fire and Forest Ecosystem Health team produces?*

Answer: *Yes. The FFEH Team is still working on development of the Last Chance maps, but the most recent iteration of the map looks like a major improvement over the initial iteration. The FFEH Team still needs to produce maps for Sugar Pine (i.e. fisher habitat); the assumption is that the work on the Sugar Pine maps will go more quickly since many of the issues have been identified while working on the Last Chance maps.*

Question: *How did the American fire affect the owl territories? How will the fire be incorporated into the final report?*

Answer: *The science teams did get some money to go out and re-measure in the burn area. However, that information will not be included in the final SNAMP report. It is a completely separate study.*

VI. Next Steps/ Wrap up/ Evaluation: Susie Kocher asked for feedback on the meeting and contents. Participants said that the location and facilitation was good. There was a good balance between presentation and discussion. Lunch was productive and on task and staying in the larger group was good. It was good to have the microphone so everyone could be heard. On the negative side, it would have been good to have readings ahead of time and participants didn't like not having the scheduled break.

Participants also filled out an evaluation form. Results are summarized below:

Evaluation of 6/19/2014 OWL IT meeting (N=20)

